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What is claimed is:

1. A plasma processing apparatus having a process chamber in which an object to be processed is subjected to a plasma processing, comprising:

a light-receiving part for monitoring a plasma emission in said process chamber;

a spectrometer unit for performing a spectrometry on said plasma emission to convert the same into a multi-channel signal;

an arithmetic unit for converting said multi-channel signal into one or more output signals and performing an arithmetic operation on the output signals;

a database for storing a filter vector;

a determination unit for determining a condition in the process chamber based on a result of said arithmetic operation; and

an apparatus controller for controlling an operation of said plasma processing apparatus in response to a signal from said determination unit.

2. The plasma processing apparatus according to claim 1, wherein the conversion of said multi-channel signal into one or more signals by said arithmetic unit is performed using a multivariate analysis.

3. The plasma processing apparatus according to claim 1, wherein the conversion by said arithmetic unit is performed using the filter vector.

4. The plasma processing apparatus according to any one of claims 1 to 3, wherein the determination of the condition in the process chamber by said arithmetic unit is performed in such a manner that one or more differences between said one or more output signals derived from a batch of plasma emission data by multivariate analysis and one or more output signals derived from the preceding batch of plasma emission data are found, an average value of the differences in one batch, a difference between a maximum and a minimum of the differences in one batch and a standard deviation of the differences in one batch are determined, and the values are compared with a preset threshold.

5. The plasma processing apparatus according to any one of claims 1 to 3, wherein the determination of the condition in the process chamber by said arithmetic unit is performed in such a manner that one or more differences between said one or more output signals derived from a batch of plasma emission data by multivariate analysis and one or more output signals derived from the preceding batch of plasma emission data are found, an average value of the differences in one batch, a difference between a maximum and a minimum of the differences

in one batch and a standard deviation of the differences in one batch are determined, the values are compared with a plurality of preset thresholds to calculate a point for each of the values, and the sum of the points is compared with a preset threshold.

6. The plasma processing apparatus according to any one of claims 1 to 5, wherein the determination of the condition in said process chamber is determination that an end point of the seasoning is reached.

7. The plasma processing apparatus according to any one of claims 1 to 6, wherein the conversion of said multi-channel signal into one or more signals by said arithmetic unit is performed using a principal component analysis.

8. A plasma processing method using a plasma processing apparatus having:

- a process chamber in which a substrate is subjected to a plasma processing;

- a light-receiving part for monitoring a plasma emission in the process chamber;

- a spectrometer unit for performing a spectrometry on the received plasma emission to convert the same into a multi-channel signal;

an arithmetic unit for converting the multi-channel signal into one or more output signals and performing an arithmetic operation on the output signals;

a database for storing a filter vector;

a determination unit for determining a condition in the process chamber based on a result of the arithmetic operation;

and

an apparatus controller for controlling an operation of the plasma processing apparatus in response to a signal from the determination unit,

the method comprising:

a step of converting the multi-channel signal output from the spectrometer unit into a batch of output signals;

a step of finding differences between the output signals and output signals of the preceding batch; and

a step of comparing an average value of the differences in one batch, a difference between a maximum and a minimum of the differences in one batch and a standard deviation of the differences in one batch with a preset threshold.

9. A plasma processing method using a plasma processing apparatus having:

a process chamber in which a substrate is subjected to a plasma processing;

a light-receiving part for monitoring a plasma emission in the process chamber;

a spectrometer unit for performing a spectrometry on the received plasma emission to convert the same into a multi-channel signal;

an arithmetic unit for converting the multi-channel signal into one or more output signals and performing an arithmetic operation on the output signals;

a database for storing a filter vector;

a determination unit for determining a condition in the process chamber based on a result of the arithmetic operation; and

an apparatus controller for controlling an operation of the plasma processing apparatus in response to a signal from the determination unit,

the method comprising:

a step of performing evacuation after a wet cleaning;

a step of automatically determining whether a degree of vacuum is adequate or not;

a step of automatically determining whether there is an apparatus abnormality or not;

a step of converting the multi-channel signal output from the spectrometer unit into a batch of output signals;

a step of finding differences between the output signals and output signals of the preceding batch; and

a step of comparing an average value of the differences in one batch, a difference between a maximum and a minimum

of the differences in one batch and a standard deviation of the differences in one batch with a preset threshold.